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AUTHOR Barton, Keith C.
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ABSTRACT

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by Keith C. Barton

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"That's a tricky piece!":

Children's understanding of historical time in Northern Ireland

Keith C. Barton

Division of Teacher Education

University of Cincinnati

Cincinnati, OH 45221-0002

kbarton@tso.cin.ix.net

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Abstract

This study used open-ended interviews and classroom observations to examine the development of children's understanding of historical time in Northern Ireland. Even the youngest made distinctions among past times, and these differentiations became increasingly numerous with age: students also were able to sequence historic time periods with a high degree of accuracy. This categorization and sequencing involved using personal and family experience, historical information learned in and out of school, and assumptions about the nature of change over time. In addition, students had mastered the arithmetical and linguistic conventions for dates and other standardized notations of time, but the accuracy of their attempts to use such systems depended on their recognition of reference points which they associated with specific visual images; these reference points also derived from personal and family experience and historical information learned in and out of school. These findings indicate that students' understanding of historical time depends on their facility with a set of learned and culturally embedded strategies for describing the past. Differences between the students in this study and those described in previous U.S. research further highlight the impact of learning and cultural context on the development of chidren's understanding of historical time.

"That's a tricky piece!":
Children's understanding of historical time in Northern Ireland

When I was a child—maybe 8 or 10 years old—I saw a television program in which everyone but a single person disappeared from Earth. At one point the lone remaining character looked at a clock, only to find the hands missing; the face of the clock was the same as usual, but there was no way to tell the time. I didn't understand, but my older brother (a college student already) explained that without people, there is no time: Time doesn't exist in nature, he told me, it's something people invent. If there were no people, there would be no time. I was just old enough to make sense of his explanation, and the episode has stayed fresh in my memory; it was probably my first exposure to the idea that our perception of the world comes not only from direct experience but from the culturally created concepts we use to make sense of those experiences.

In modern industrial society, time is a particularly useful concept for making sense of the world. Appointments, opening hours, production schedules, and workdays all depend on our agreement about the meaning of time. Minutes, hours, and days are useful because we agree on what it means to say "Be there at eleven," or "Open 7 Days a Week," or "The game starts in ten minutes." Cross–cultural settings frequently demonstrate how much of this agreement we take for granted, and how radically other people's assumptions about time can differ from our own. Businesspeople assigned to another country may realize that "I'll see you at two o'clock" or "Let's meet for a few minutes" require different concepts of *two o'clock* or *a few minutes* than they're used to; similarly, foreign exchange students in the United States sometimes find that "I'll call you later" carries a different meaning of *later* than they expected. When our assumptions about time are challenged, we realize how much we depend on socially shared conventions to make sense of the world.

Teaching and parenting, on the other hand, make us aware of how long it takes children to master these concepts of time and how much variation occurs in their understanding. Young children often do not distinguish between seconds and minutes and they have unrealistic expectations about how quickly hours should pass. By the middle years of primary school, most children understand the distinction between seconds, minutes, and hours, but while some can finely calculate the amount of time until recess or lunch, others move through a haze of temporal confusion, with little apparent understanding of the day's schedule or any recognition of where the present moment fits into those activities. Teachers of young children are keenly aware of the need to develop time concepts, and a significant portion of their curriculum involves the introduction and refinement of children's understanding of time. Psychologists, meanwhile, have produced a substantial body of research on some aspects of children's understanding of time. (See, for example, Fraisse, 1963, and Friedman, 1982, 1978.)

When it comes to historical time, though, it's easy to forget that our systems for classifying the past are human creations. Understanding time seems so critical to learning history that we rarely examine the matter in any great detail—we take for granted that students should know when things happened, and we leave it at that. In North America and Europe, dates in particular seem to carry the weight of both authority and antiquity. Who can deny that the Battle of Hastings took place in 1066 or that Oliver Cromwell died in 1658? Because these statements appear to be simple statements of objective reality, we don't often reflect on the fact that our systems for measuring historical time are simply tools that people have developed to help them make sense of the past.

The unfortunate result of this lack of attention is that we neglect to teach children how to use those tools, and we treat statements of historical time as we do any other pieces of factual information—as data to be learned (or looked up). Knowing when Oliver Cromwell died is regarded as the same type of knowledge as knowing that Jupiter has sixteen moons. Although educators long ago abandoned the idea that students should

memorize lists of dates, they have not firmly established alternative approaches to dealing with historical time; as a result, the general public (and quite a few historians and politicians) continue to think of the rapid retrieval of dates as an essential characteristic of the subject. After all, the Battle of Hastings really did take place in 1066, and Oliver Cromwell did die in 1658. Our conviction that statements like these are true, and our lingering guilt that we should know more of them than we do, causes us to run scurrying from any deeper examination of the role of historical time in the curriculum.

Because of our avoidance of the topic, we still know very little about how children's understanding of historical time develops, or even what the components of that understanding are. Teaching any subject requires knowing what skills students need and how they learn them—what knowledge they already have, what strategies they use in trying to understand new information, what difficulties they encounter. Yet in 1988, Thornton and Vukelich found that research on children's understanding of historical time was spotty at best—a few scattered studies with no consistent theoretical framework, methodology, or findings. Nor have matters improved much since then. A colleague beginning work on the topic recently contacted me to ask where all the studies of historical time were—he was sure he must be missing something, that there had to be more studies out there somewhere.

But there aren't. It's as though literacy educators had never done any research on how children learn to spell, or math educators on how children learn to add. As a result of this lack of research, teachers are inadequately prepared to develop children's understanding of historical time. Most methods textbooks, for example, limit their treatment of the topic to the description of a few creative lesson ideas—while these lessons may be meaningful and engaging, they are recommended on the basis of intuition or anecdotal evidence, not because of a substantial or systematic base of empirical research. Perhaps most disturbingly, both curricular recommendations and advice to teachers often reduce the complexities of children's understanding of historical time to simplistic

formulas—thus teachers often mistakenly believe that children are "incapable" of understanding dates before age 9 (or 10, or 11, or 12, depending on the author they've read), or that teaching young children about historical time should be limited to helping them learn the meaning of *before* and *after*. Such beliefs are the equivalent of asserting that children are incapable of learning to spell before age 8 or that their first exposure to spelling should be limited to foods that begin with *q*. Statements like these are not only lacking in evidence, they also oversimplify complex processes and result in instruction that does little to develop children's understanding.

The impoverished state of research on the subject led Thornton and Vukelich to call for a reconceptualization of children's understanding of time. In 1996, Linda Levstik and I responded to that call in our study children from ages 5 to 12 (Barton and Levstik, 1996; Levstik and Barton, 1996). We attempted to move beyond previous research in three ways. First, instead of a paper-and-pencil task, we used visual images: By having students work with pictures from approximately the last two centuries of U. S. history—pictures which included people, technology, architecture, and fashion—we hoped to tap into a wider range of understanding of the past than we would be likely to achieve using written lists of people or events. Second, instead of asking students to identify dates, we asked them to arrange a set of pictures in a sequence and to explain their reasoning. By focusing on children's explanations, we hoped to explore how they perceived historical time, not simply to establish whether they were familiar with a set of dates that adults considered historically important. Finally, we used open-ended interviews in order to probe students' responses. Although such interviews require a great deal of time—and thus limit the number of students who are interviewed—they are indispensable in studies of children's thinking because they allow children to explain their reasoning, and they allow the researcher to explore novel or unexpected issues that emerge from the responses. While open-ended interviews are a standard procedure in research on children's understanding of mathematics and science, they had not previously been used in studies of historical time.

A number of important findings arose from that study. First, it became clear that even the youngest children had an impressive store of historical knowledge, and that the range and depth of their knowledge increased each year; children's placement of pictures in the sequence, for example, almost always accorded with what adults would consider the correct order, and across grade levels children gave increasingly detailed and complete explanations of how they knew that order. Second, even the youngest children made distinctions among times in the past, and these distinctions became more and more refined as they got older; while some younger children distinguished only a few time periods—grouping all pictures into categories such as *long ago, in the middle, close to now,* and *now*—older children separated pictures into more finely differentiated categories. Finally, children's ability to use conventional markers of time—both dates and period names such as *Colonial Era*—lagged considerably behind their ability to make distinctions in historical time; thus children could distinguish pictures from different times (and explain their reasoning) much earlier than they could assign dates or period names to those times.

One of the most important findings of the study, then, was to establish the distinction between children's understanding of historical time and their ability to use systems of dating that time: Children clearly had an understanding of historical time long before they had a complete understanding of dates. While that conclusion is hardly surprising, and probably fits well with most educators' intuition, it has one very significant implication: To children, knowing *when* something happened means knowing what the world looked like at that time, not knowing what the date was. As adults, knowing that an even took place in 1930 tells us when it was, but dates don't have the same effect on children, because they haven't mastered the dating system yet; they understand when something happened not when they hear a date but when they see a picture of that time. Part of the task of educators, Levstik and I have argued, is to help students make the connection between those visual images and the systems of dating we use in our culture (Levstik and Barton, 1997).

This study attempts to take that reconceptualization even further. While relying on similar research methods—open-ended interviews in which children order a set of historical pictures and explain their reasoning (in this case supplemented by classroom observations)—it moves beyond the previous study in a number of ways. First, this study was conducted in Northern Ireland; doing the research in a different setting has the potential to provide greater insight into how children's reasoning is influenced by their social and cultural backgrounds. Second, children in this study worked not only with a set of pictures from the last two hundred years, but also with one from the last ten thousand years—that set included pictures from Ireland, England, the Roman Empire, Ancient Egypt, and Incan Civilization; using pictures from more widely separated times has the advantage of demonstrating how children reason about times further removed from the present. Perhaps most importantly, this study examines in more detail the strategies children employed to order pictures, to assign dates and names of periods, and to coordinate the different aspects of their understanding. This study thus focuses not just on children's categorization and representation of historical time but on the development of their understanding of overlapping systems of cultural knowledge related to the past.

Background and Research Procedures

In many respects, primary schools in Northern Ireland are little different than elementary schools in the United States: A U.S. visitor walking into a classroom there would be hard pressed to identify many ostensible differences in the setup or organization of the room, the systems of management or discipline, the kinds of resources used, the patterns of interaction among students or between students and teachers, or in the overall climate of the school. (And just as in the U.S., there is a wide range of variation on each of these dimensions.) Indeed, some educators there told me that schools in Northern Ireland had been greatly influenced by the U.S. educational system; one teacher who had worked

in a U.S. school found the greatest difference to lie in the larger number of personnel available in the U.S. to help students with special needs. For the purposes of this study, the most important distinctions between the American and Northern Ireland educational systems lie in differences in the structure of student enrollment and in the specific content of the history curriculum.

Student enrollment

Children in Northern Ireland begin school at least one year earlier than kindergartners in the United States (and many also attend a year of Nursery School before that). Beginning with the first compulsory year of school at age 4, grade levels are designated as Primary 1, Primary 2, and so on. Although the first years of primary school include an element of structured play, they also contain a significant degree of academic content, and students are expected to enter P3 (the equivalent of Grade 1) already able to read. Because the cut-off date for entrance into P1 is June 30 (rather than the typical September 30 in the U.S.) students at any given grade level will be 25 percent older—and will have been in school one or two years longer—than their U.S. counterparts. Students remain in Primary School through P7; the first year of secondary schooling is usually referred to as Year 8. In examining this research, then, it is critical for readers to translate grade levels into their equivalents on the other side of the Atlantic—thus Primary 4 in Northern Ireland is equivalent to Grade 2 in the United States, and so on. (See Figure 1.)

Figure 1. Grade level comparisons

Age	United States	Northern Ireland
3	Preschool	Nursery
4	Preschool	Primary 1 (P1)
5	Kindergarten	Primary 2 (P2)
6	Grade 1	Primary 3 (P3)
7	Grade 2	Primary 4 (P4)
8	Grade 3	Primary 5 (P5)
9	Grade 4	Primary 6 (P6)
10	Grade 5	Primary 7 (P7)
11	Grade 6	Year 8

Most schools in Northern Ireland are attended by a population of students who are either exclusively Protestant or exclusively Catholic (or nearly so). Those attended mainly by Protestants are known as *controlled schools* and are under the management of local education authorities, and those attended mainly by Catholics are known as *maintained schools* and are managed by the Catholic church. Although both controlled and maintained schools are officially open to children of all denominations, in practice few students (particularly at the elementary level) attend schools in which the majority are a different religion than themselves. A small number of schools in Northern Ireland are *integrated schools* and are attended in roughly equal numbers by students of each religious tradition; although the number of students attending integrated schools is small—approximately 3 percent of the population—they constitute a rapidly growing sector of the educational system. All three types of schools are funded by the government of the United Kingdom, and all follow the guidelines of the Northern Ireland Curriculum.

History curriculum and instruction

The study of history begins earlier in Northern Ireland schools than in the United States, although it does not necessarily play a larger part in the curriculum. As in the U. S., educators in Northern Ireland are quick to point out that history has a lower status than reading, language and mathematics, and that it occupies a much smaller portion of the curriculum than those subjects. Contributing to the lower status of history is the "11 plus exam," as it is usually known: Midway through the last year of primary school, students take a standardized test to determine their eligibility for selective grammar schools; because of the strongly differentiated secondary educational system, these tests have an enormous impact on students' future academic careers and thus have a controlling influence on primary instruction—and the tests do not include history. As a result, schools have little incentive to devote more time to the subject than the required minimum. In addition, most P7 classrooms spend the first part of the year preparing for the selection exams, and those students usually do not study any history until the second term.

The Northern Ireland Curriculum requires the study of history at all levels. But while students in the earliest grades may occasionally compare aspects of past and present—chores, pastimes, and so on—or create simple family trees, formal study of the subject begins in P4, when students study a specific time period through a unit such as "Life in the Recent Past," involving comparisons of life in the 1940s/1950s with life today, or "Life during the War," focusing on the effect of World War II on daily life in Northern Ireland. Each year from P5 to P7, classrooms engage in a history unit required by the Northern Ireland Curriculum; each unit typically lasts about one term (half the school year), with between sixty and ninety minutes spent on the unit each week. In P5, students study "Life in Early Times," which focuses on the Mesolithic and Neolithic periods in Ireland; P6 students study "The Vikings," which focuses on the nature of Viking society in Scandinavia and the impact of Viking raiders and settlers on Ireland and elsewhere; the required P7 unit is "Life in Victorian Times," which includes the lives of people in both

town and country at different levels of society in Britain and Ireland. As part of each year's unit, classes also study a supplemental topic, usually based on the teacher's interest or background or the availability of resources. Among the most popular supplemental topics are the Ancient Egyptians, the Famine, and "line of development" studies such as the history of transportation.

Primary history instruction in Northern Ireland differs from that in the U.S. in two important ways. First, there are no U.S.-style history textbooks. Rather, students work on a variety of activities which center around the topic of the unit—Ancient Egyptians, Viking Life, and so on. Sometimes this involves reading or listening to short texts (often one or two pages per day) and discussing them, but most of students' time is devoted to working on handouts related to the readings or on short group or individual projects. The handouts I saw students working on were usually fairly easy, and most students completed them in twenty or thirty minutes with minimal assistance; their content ranged from sequencing pictures (such as a series of Mesolithic hunting activities), to drawing pictures of how people now and in the past met basic needs, to looking at photographs and making inferences (about schools in the 1950s, for instance). Among the projects I observed or that students told me about were building Vikings ships, making World War II ration cards, writing diary entries from the perspective of a Viking woman, bringing artifacts from home and describing them to the class, and "excavating" the school rubbish bin to reach conclusions about the day's activities. Individually, each of these activities would seem very familiar to U.S. educators, but taken together the pattern of instruction differs from that in the U.S. both because it does not revolve around a single textbook and because students are not asked to recall or look up factual information—there was nothing like filling in blanks or answering questions at the end of chapters.

A second key difference is that primary history in Northern Ireland does not involve studying a chronological narrative. Students at each grade level study one or two specific times in history, and lessons focus on what life was like at that time—how people met their

needs, the organization of social life, their beliefs, and so on. There is neither an attempt to connect different topics into an overall "story"—either of world history, British history, or the history of Northern Ireland—nor is there a connected narrative within topics. Although most schools cover the required topics in P5 through P7 in chronological order, the P4 and Y8 topics (The Recent Past and Roman Life), as well as many supplementary topics, do not conform to this order. Moreover, within each grade level (before Y8 at least), students focus on the social and material life of people at the time—they do not study narratives such as the "rise of Egyptian Civilization" or the "arrival and departure" of Vikings in Ireland. This is in direct contrast to nearly all history instruction in the U.S.: while students in the U.S. may also study social and material life, they do so within the context of a connected narrative of state, U.S., or world history. Fifth or eighth graders, for example, would study Life in the Colonial Era as a unit wedged between—and explicitly connected to—Exploration and Settlement and The American Revolution. Even in the lower elementary grades, topics such as Columbus, the Pilgrims, George Washington, Harriet Tubman, or Martin Luther King are all explicitly related to a narrative of national development.

Research procedures

This study relied on two principal research methods. The first involved open-ended, semi-structured interviews with students from P3 to Y8. In each interview, I showed students a set of pictures either from the last 200 years (Set A) or from the last 10,000 years (Set B), asked them to arrange the pictures in chronological order, to explain the reasons for their placements, and finally to estimate when each picture was. (See Figure 1.) I followed this task with a set of more general questions about history and about where students had learned about the past. (See Appendix A for the complete interview protocol.) Pictures in Set A were chosen to match as closely as possible those used in previous research (Barton and Levstik, 1996; Barton, 1994) but within the context of Northern

of Northern Ireland and Ulster.[1] Pictures in Set B were chosen to represent widely separated time periods in the history of Western civilization (but also included one picture of a non–Western culture). All Set A pictures were black and white, and all were originally produced contemporaneously with the time periods they represent (i.e., the picture representing the 1780s was drawn in the 1780s); Set B included both black and white and color pictures, as well as pictures both from the times they represent and later recreations (i.e., the Elizabethan picture is from a 1571 painting, but the Mesolithic picture is a photograph of a modern model of a Mesolithic home). Students were shown the first two pictures simultaneously and asked to place the one from "longest ago" on one side and the one from "closest to now" on the other; they were then shown each of the other pictures one at a time and asked whether each belonged between two others, before or after the others, or at about the same time as any of the others.

[1] *Northern Ireland* refers to a political unit that has only been in existence since the 1920s, and thus the term cannot properly be used when discussing earlier time periods; *Ulster* refers to one of Ireland's four traditional provinces; it includes all of what is now Northern Ireland as well as three counties in the Republic of Ireland. The pictures in Set A came from counties Down, Antrim, Londonderry, and Donegal; all are in Ulster, and all but the last are now part of Northern Ireland.

Figure 2. Materials used in interview tasks

Set A

Order	Description	Date
1a	Family with spinning wheel in front of thatched cottage	ca. 1890s
1b	Family picnicking at roadside tables	ca. late 1950s
2	Two men and cars next to a petrol station	1933
3	High Street, Belfast, with people and horses and carts	ca. 1830s
4	Students in technical school dressmaking and needlework class	1946
5	Outdoor flax production	1783
6	Teacher and students in primary classroom	ca. 1900
7	Man standing by cars in front of modern building	1997
8	Speakers with microphone and loudspeaker at demonstration	1968

Set B

Order	Description	Period
1a	People and cars on street (black and white photograph)	Edwardian
1b	Soldiers and horses from Bayeux tapestry (faded color photograph of a tapestry)	Norman
2*	Urban street from *An Election: Canvassing for Votes* (Hogarth, 1754) (bright color photograph of a painting)	Georgian
3	Roman boy in knee-length tunic (bright color photograph of a mosaic)	Roman
4	People viewing large machine at the Great Exhibition of 1851 (bright color photograph of a painting)	Victorian
5	Family cooking inside skin dwelling (bright color photograph of a model)	Mesolithic
6	Queen Elizabeth being carried above a crowd (Gheeraerts, 1571) (faded black and white photograph of a painting)	Elizabethan
7	People and cars in front of a shop, 1974 (black and white photograph)	Modern
8	Busy urban scene of Incan Civilization (bright color photograph of a modern painting)	Incan
9*	Man and woman with weapons and jewelry in front of thatched dwelling (bright color reproduction of a modern painting)	Iron Age

*Students were shown either the Georgian or Iron Age pictures, but not both. Students who were shown the Iron Age picture were shown the Victorian picture in position 2 above, and were shown the Elizabethan picture after the Roman picture instead of before; the order of presentation was otherwise the same.

I interviewed 121 students in grades P3 through Y8 during a total of 60 interviews at four separate schools. Two were integrated schools (one primary and one secondary), one was a controlled school, and one was a maintained school. At each school, the faculty were asked to select students who represented the range of abilities in their classrooms and who would not be afraid to talk to a stranger. Interviews were conducted during school hours, usually in libraries or other quiet rooms of the building, and nearly all students were open and talkative and appeared comfortable during interviews; because of the influence of U.S. television, students had no trouble understanding my accent, although the reverse was not always the case. (The number of students interviewed at each grade and at each school can be found in Appendix B.)

In addition to interviewing students, I conducted classroom observations in grades P4, P5, and P6 at the integrated primary school; I observed most of the history lessons taught in the school during approximately a three month period, for a total of 38 observations (including two field trips related to history). Because students spent the majority of instructional time working on individual or group assignments, I also had innumerable opportunities to talk to students during these observations. Combining interviews with classroom observations had the obvious advantage of allowing comparisons of students' responses to what they had learned in class, as well as the chance to ask questions about the content that arose in the course of instruction.[2]

All three schools were in rural areas far from Belfast, Northern Ireland's major urban center, but taken together they provided an interesting mixture of locations within the region. The integrated schools were in a district with a large town and several small and medium villages, and students came from throughout this area; although roughly equal numbers of Protestants and Catholics were enrolled, all came from communities which

[2]My interactions with students in classrooms also made them more comfortable in interviews, so I was able to probe their answers much more extensively than I was with students at the other schools. In addition, my daughter was enrolled in the school in which I was observing, so I was personally familiar with many of the children, their siblings, and their parents, all of which made them even more willing to talk during interviews.

were predominantly Protestant. Both the controlled and maintained schools were in small villages, one predominantly Protestant, one Catholic, and both drew exclusively from their immediate surroundings. Economically, all schools enrolled students from a wide variety of backgrounds, but one included a large portion of children whose parents were middle-class professionals; families at another were much poorer and included a high proportion of farmers, skilled or unskilled laborers, and the unemployed; the third school fell between these two extremes. Students in these schools thus represented a range of the backgrounds of students in rural Northern Ireland.

Findings

As noted earlier, understanding of historical time cannot be plotted along a single dimension, and still less can children of a given age be characterized as simply grasping or not grasping the subject. Understanding historical time is a complex and multifaceted topic, one that requires children to come to grips with a number of parallel cultural systems for categorizing, describing, and measuring distances in time. This research yielded information on three key aspects of that process—how children in Northern Ireland categorized and sequenced times in history, the strategies they used in making decisions about the order of times past, and their facility with standardized systems of notation for historical time, such as dates and the names of periods.

Categorizing distances in time

The first observation about children's understanding of time is crucial, but is easily overlooked: All the students in this study had been socialized into an understanding of historical time that enabled them to complete the research task with ease. That is, all students understood the explanation of what was called for and proceeded to arrange pictures with minimal clarification. None of the students asked for the directions to be

repeated, none hesitated over what to do, none appeared uncomfortable with the task, and most approached each new picture—as well as the overall task and the interview itself—with eagerness and enthusiasm. In addition, nearly all students used terms like *older*, *younger*, *closer to now*, and *longer ago* comfortably and naturally. Some younger students, who had never completed a task like this in school, nonetheless said it was easy because "I'm very good at this" (Matthew, P3) or "I'm good at history" (Sophie, P3). Put simply, students already knew that pictures could be put in sequence based on hold old they were. The following sections deals with three aspects of that sequencing—the number of time categories students used, the pictures students thought should be grouped with others, and the order in which they placed pictures.

Categories of time. In arranging pictures from the last two hundred years, most students at each grade level placed at least some pictures together into the same time periods. P3 students, for example, divided the nine pictures into between three and six distinct groups. (See Figure 3 for examples.) Joshua and Luke used six categories: They thought the 1940s and 1950s pictures were from about the same time and that the 1900, 1930s, and 1960s also fell at about the same time as each other; they placed each of the others, however, into a separate place in the sequence and differentiated them from surrounding pictures. P3 students Matthew and Morna used the fewest categories: They grouped the 1780s, 1830s, and 1890s pictures together, placed the 1990s picture by itself as the newest, and placed the remaining five pictures in the middle.

Figure 3. Time categories used by P3 students (Set A)

Joshua and Luke	1890s	1780s	1830s	1900/1930s/1960s		1940s/1950s	1990s
Robin and Sophie	1780s	1830s		1890s/1900/1940s/1960s		1930s 1950s	1990s
Matthew and Morna	1780s/1830s/1890s			1900/1930s/1940s/1950s/1960s			1990s

P4 and P5 students divided the pictures into more categories than those in P3, but they continued to group some pictures into the same times; the number of categories ranged from four to seven, with just over half of students using either six or seven categories. By P6 and P7, students never used fewer than six categories, and over half distinguished either eight or nine distinct periods. In addition, students in grades P4 and above never used large groupings like Matthew's and Morna's (with five pictures identified as the same time); they placed pictures together with one or at most two others. At each grade level except Year 8 (where only two sets of students were interviewed), students distinguished more distinct time periods than students in the previous grade. (See Figure 4.)

Figure 4. Average number of time categories distinguished

		P3	P4	P5	P6	P7	Y8
Picture Set A	(200 years)	4.7	5.6	5.9	6.7	7.7	6.0
Picture Set B	(10,000 years)	6.0	8.3	7.6	8.3	7.3	7.5

In addition, even the youngest students indicted they knew there were more categories of time than they were using at the moment. P3 Morna, for example, explained how a picture would look if it were between the oldest and middle times; although she only recognized three distinct times in this particular set of pictures, she knew that others would not necessarily fall into any of those three periods. Joshua and Luke also brought up the topic of other time periods: They said that Jesus would go before any of the pictures, and they disagreed over whether the Age of Reptiles and the Age of Mammals would come before or after Jesus. This greater level of differentiation was even more apparent when students worked with Set B, which included pictures from the last ten thousand years. With that task, grouping pictures together was the exception rather than the rule: Over two–thirds of students sorted them into either eight or nine distinct times, and only one Y8 and a pair of P3 students used five or fewer categories. Students' responses show no clear

developmental trend across grade levels because the average number of categories they used was so high from an early age. (See Figure 4.) Taken together with their responses to Set A, these responses indicate that even young students know the past can be divided into different times, and that the number of such differentiations they make grows as they get older.

Grouping of pictures. Only a few clear patterns emerge from students' choices of the pictures that should be grouped with others. As shown in Figure 5, each of five pictures from Set A (1780s, 1830s, 1890s, 1930s, and 1960s) were grouped about half the time. The one picture students consistently distinguished from the rest was the 1990s picture; nearly all were confident that it was the most recent, and many immediately exclaimed "Newest!" when they first saw it. At each level, the picture least likely to be distinguished as a distinct time period was the one from 1900, and this may have been because of characteristics of the picture itself: Several students commented on the fact that there weren't as many clues in it because the setting was indoor. Three other pictures show differences in grouping across grade levels: Those from the 1890s, 1940s, and 1960s were much more likely to be differentiated by students in P6 and P7 than in P3, P4, and P5; the 1890s and 1960s in particular were considered distinct by a large majority of students in the upper grades.[3]

[3]When the students in an interview agreed on the grouping of pictures, their answers were treated as a single response, for it was impossible to determine if they actually agreed or whether one simply assented to the other's choices. When students disagreed on any of the groupings, their entire sequence was treated as a separate response. The number of responses at each grade level in Figures 5 and 6, then, do not match the number of children interviewed because some students agreed with each other and some did not.

Figure 5. Portion of responses in which pictures were grouped with others

	P3 (N=3)	P4 (N=10)	P5 (N=9)	P6 (N=11)	P7 (N=6)	Y8 (N=2)	Average
1780s	.33	.80	.44	.45	.17	1.00	.51
1830s	.33	.90	.44	.45	.50	50	.56
1890s	.67	.60	.89	.09	.17	50	.46
1900	1.00	.80	.89	.55	.67	.00	.71
1930s	.67	.50	.88	.27	.33	.00	.46
1940s	1.00	.90	.89	.45	.33	1.00	.71
1950s	1.00	.50	.67	.55	.67	1.00	.63
1960s	1.00	.70	.67	.18	.00	1.00	.49
1990s	.33	.10	.00	.00	.00	.00	.05

Even fewer patterns emerge from the responses of students who worked with Set B, particularly because they grouped pictures together so much less frequently than those who worked with the more recent set. Except for the Georgian picture (which was grouped with others two thirds of the time), no picture was grouped in more than 40 percent of the responses. (See Figure 6). The most consistent distinctions were made with the Modern and Mesolithic pictures, which almost no students grouped with any others. In addition, only eleven percent of students grouped the Elizabethan picture with others, and all students in P6 and above considered it a distinct period. Taken together with the responses to Set A, then, these results reveal wide variation among students' perceptions: Some students considered some pictures to be from distinct time periods, while other students identified different pictures as distinct. Even those pictures which garnered the most agreement among students—Mesolithic, Elizabethan, 1890s, Modern, and 1990s—point to the absence of a clear overall pattern: Students differentiated time periods at both ends of the scale and at various points in the middle.

Figure 6. Portion of responses in which pictures were grouped with others (Set B)

	P3 (N=3)	P4 (N=7)	P5 (N=5)	P6 (N=10)	P7 (N=9)	Y8 (N=2)	Average
Mesolithic	.33	14	00	00	00	00	06
Roman	.33	14	40	30	00	50	22
Incan	.33	14	20	30	11	50	22
Iron Age	N/A*	29	50	00	67	1 00	40
Norman	.33	00	60	20	67	50	36
Elizabethan	.33	14	40	00	00	00	11
Georgian	1 00	N/A*	67	50	N/A*	50	64
Victorian	1 00	14	60	20	33	50	33
Edwardian	.33	14	20	00	33	50	19
Modern	.33	00	00	00	00	00	03

*No students at this grade level were presented with this picture

Order of placement. Perhaps the most surprising finding of this study is the consistency with which students placed pictures in the correct order. Among students who worked with Set A, only 16 percent of their responses were incorrect (64 responses out of a total of 405); only 20 percent of responses were incorrect among those who worked with Set B (64 responses out of 324). (See Figure 7.) In addition, 20 percent of the time students made *no* incorrect placements in Set A (8 of 41 responses), and 14 percent of the time in Set B (5 of 36 responses). When students did place pictures in the wrong order, they usually missed the correct position by no more than two spaces in the sequence: With Set A, 75 percent of incorrect placements (48 of 64) were off by fewer than two positions, and with Set B 50 percent were (32 of 64). (The more extreme incorrect placements in Set B were usually made by students in P3 and P4; 74 percent of incorrect placements in P5 and above were off by fewer than two positions.) Although responses to Set B suggest the possibility of a developmental pattern—with older students doing substantially better than

younger ones—the fundamental finding of this portion of the study should not be overlooked: Even students as young as P3 placed most of the pictures in the correct order.

Figure 7 Average portion of incorrect placements

	P3	P4	P5	P6	P7	Y8	Average
Picture Set A	.15	.22	.17	.20	.21	.06	.16
Picture Set B	.41	.30	.20	.19	.09	.11	.20

Although the interview task itself only called for students to arrange the pictures in a sequence, their responses and explanations often indicated their understanding of the relative distance between the pictures as well. Upon seeing the 1830s or 1780s pictures, for instance, students sometimes gasped or exclaimed "Oh, that would be long ago, very old!" or "Oh, that'd be long ago, that'd be over there!" And when asked to assign dates to pictures, students sometimes prefaced their estimates with observations such as "Much older," or "They're really old." The two historical topics all students in P5 and above had studied were the Mesolithic Era and the Vikings, and nearly all indicated that these times would fall much earlier than the picture from the 1780s. Some students multiplied intensifiers to indicate their understanding of relative time: P4 Jack, for example, thought Jesus would be "way far back" and Ancient Egypt would be "way way way way far back." P3 Joshua also suggested that Jesus would go "way down down down down through this room" and into the next. Like Joshua, P4 Emily found the environment too confining to express her understanding of relative historical time: She walked to the end of the hallway to show where Vikings would go in comparison to more recent pictures, and in dating the older pictures she repeatedly referred to "thouuuuuuusands of years," dragging out the vowel for effect.

Interestingly, though, students were less adept at sequencing other times they knew about other than those in the pictures. During interviews, other periods often arose in

conversation—particularly World War II, the time of Jesus, and school topics such as the Vikings or the Ancient Egyptians—and I usually asked students where those times would go in relation to the pictures in front of them. Students in P7 and above nearly always put these additional times in the correct order, but P5 and P6 students got them wrong as often as right. (P3 and P4 students rarely mentioned other times.) Some students, for example, though the Vikings came before the Ancient Egyptians, while others thought they were at the same time as the 1780s or 1830s pictures; other students thought World War II was at the time of the 1780s picture, or even the time of the Elizabethan picture.

Co–ordinating the time of Jesus with other historical periods was a particularly difficult challenge. During classroom observations in the P5 and P6 classrooms I had the chance to ask students where Jesus came in relation to the topics they were studying. Some P5 students thought he must have lived before Mesolithic people because, as one of them said, "If Jesus wasn't there, he couldn't have made them." Another student, though, thought Jesus came later because "in the Bible, Jesus was sent down to tell them about the Lord." Still others agreed with the students who pointed out that Mesolithic people lived in "B.C.," and that "the calendar started when Jesus was born, that was the first year." In the P6 classroom, some students thought that Jesus came before the Vikings because he lived about two thousand years ago, and the Vikings were about a thousand years ago; other students were less sure of the dates and were puzzled how Jesus could have first since they knew the Vikings didn't believe in him—if Jesus was first, they reasoned, the Vikings would have been Christians. One P6 student's response summed up the general confusion around the issue of Jesus' position in historical time: When I asked whether Jesus or the Vikings came first, she quickly exclaimed, "Oh, that's a tricky piece!"

Students' difficulties indicate that simply learning about a time period—the war from relatives or the media, Jesus at church or at home, the Vikings at school—does not necessarily provide enough information to locate that period in relation to other times. All students knew about Jesus, but not all knew where he came in relation to school topics like

Mesolithic people or the Vikings. Not all students who had studied the Ancient Egyptians and the Vikings were certain in which order they came. This is not to say factual information about historical periods was not helpful in students' sequencing of pictures, but rather that simply having a greater store of information did not in itself enable them to locate those periods in time. Students need to learn such information in a framework which allows them to place it into a temporal sequence.

Summary and conclusions. This section has identified three important aspects of children's understanding of historical time. First, children at least as young as P3 know that pictures can be arranged in a sequence depending on how old they are, and they use several categories of historical time in doing so; as children get older, they make increasingly fine distinctions among pictures and divide them into more and more categories. Second, the particular times that students differentiate and those that they group together shows no overall developmental pattern: Students recognize distinctions in recent times, in ancient times, and at various points in the middle (and different students recognize different distinctions). Finally, students can consistently place pictures from history in the correct order (and can demonstrate their understanding of the relative distance between pictures); more than 80 percent of the responses of students in this study were correct, and even P3 students placed nearly 60 percent of pictures from world history correctly, and 85 percent from the last two centuries.

These findings fly in the face of received wisdom about children's understanding of historical time. Many teachers of young children avoid history because they believe their students cannot understand how long ago such things were—thus it's better to focus on hours, days, and months. Among those who argue for more history in the curriculum, on the other hand, a common folk belief is that students should begin by studying the distant past (hundreds of years ago if students live in the U.S., thousands if they live elsewhere in the world) and work their way forward to the present; any other pattern of study would "confuse" them and keep them from getting time periods in the right order. Recognizing the

inadequacy of that formulation, educators sometimes assert just the opposite—that the study of history should begin with the students' own lifetime and work backward, since students will first understand the times that are closest to them.

What this study shows is that all these positions—despite their intuitive appeal—are incorrect. Students' ability to sequence historical time seems to have little connection to their instruction at school. They have already learned a great deal about history before studying the topic at school, and they've managed to get most of the periods in the right order; simply learning more content about given periods does not appear to help them place those periods correctly. Moreover, students' understanding of historical time does not proceed in any neat sequence of ancient–to–modern or recent–to–distant; rather, it develops on several fronts simultaneously, extending backward from recent times, proceeding forward from ancient times, and breaking down the times in the middle. Developing students' understanding of historical time, then, is not a matter of moving them in one direction or the other, but of helping them refine and differentiate the many points of their already–developing mental timelines. Students are likely to benefit not from a sequence of study that goes exclusively in one direction or the other, but from the chance to compare and contrast times at many points in history, so that they can begin to recognize differences in times that still appear similar to them.

Strategies for locating pictures in time

As noted earlier, conceptions of measuring historical time are tools developed by society to structure our understanding of the past, and children must learn how to use those tools. Children of a given age do not simply "perceive" a particular number of time periods or their correct order, nor does their understanding develop as a simple function of increasing cognitive maturity; historical time is not "out there" in nature, an entity waiting to be understood by developing minds. Nor do children learn time periods and their arrangement the way they would learn the capitals of Europe, as a set of facts to be

memorized with more or less ease. If that were the case, then the children in this study could not have ordered the pictures correctly, because they had never seen them before. Rather, understanding historical time involves learning to use a complicated and overlapping set of culturally embedded strategies for sequencing images from the past; this process involves using factual pieces of historical information learned in school and out, identifying overall patterns in the nature of change over time, and co–ordinating historical images with personal and family experiences. The following sections examine how students make use of each of these strategies.

Strategy 1: Using historical facts. One common strategy was to look for objects students knew were not used at the same time. This was particularly obvious when they sequenced the first two pictures. Each student who worked with Set A put the pictures from the 1890s and the 1950s in the correct order, and nearly every student immediately noted that one had a thatched roof and spinning wheel, and the other had cars—they knew this meant the one with cars was newer. This was the strategy that made the greatest use of individual pieces of factual information: Students had learned—from relatives, the media, and historic sites—that thatched roofs and spinning wheels were used before the time of cars.[4] Among other objects students identified in the 1950s pictures were the sunglasses, a metal canister of Tayto crisps (potato chips), the picnic table, an aerial, and telephone poles—all of which they thought would not have existed at the time of the 1890s picture. Similarly, in sequencing the first two pictures in Set B (Norman and Edwardian), students noted the presence of axes, shields, helmets, and knights in one picture, and a car in the other. In other pictures, students identified positions within the sequence by noting the items such as horses and carts, plows, schools, factories, loudspeakers, microphones, and electric lights.

[4] Students did not think older items had ceased to exist; they knew that houses with thatched roofs still existed and that they could still see spinning wheels in use at history parks; a few students asked whether the pictures were just reconstructions (one student even used that word). But students' responses showed that they took the pictures as representative of a particular time period when such objects were in common use, rather than isolated survivals or artificial demonstrations.

Students' explanations, however, were not always correct. Many times, they knew only one half of the equation: They knew something existed in the present, but they didn't know how long it had existed. As a result, students often assumed that things we have today did are more recent in origin than they are. Several students, for example, thought that the petrol pump made the 1930s picture newer than the 1950s; we have those today, they explained, therefore that picture must be closer to now than the 1950s picture (despite the obvious presence of cars in the latter). More often, students put pictures in the correct order but gave explanations that overstated the differences between past and present. Several students, for example, thought the 1990s picture was newest because of the Coca–Cola sign in the background—and Coca–Cola, they suggested, would not have exited in the 1950s pictures or earlier. Similarly, some students thought the 1950s picture was newer than the 1890s because of the plates, cups, and kettles, which they thought people would not have had in 1890s.

This tendency to overgeneralize differences between past and present often arose in the P4 classroom I observed. Students were beginning their first systematic study of history at school, and a major focus of the topic—The Recent Past—was identification of differences between life now and fifty years ago. One day students were working on a handout in which they circled the items in "granny's larder" which did not belong there—a two–liter soda bottle, American ice cream, and so on. Students had no trouble identifying the obvious anachronisms, but they were unsure about some items; several students thought there would have been no pickled onions fifty years ago—apparently because they liked them, and thought nothing that tasty could have been around so long ago. More remarkably, some students thought the cat in the picture didn't belong—they thought there were no cats then. (Surprising as that sounds, students in other classrooms held the same belief: Some P5 and P6 students thought there would have been no dogs at the time of the Mesolithic or the Vikings.) Throughout the unit, students were much more adept at identifying differences between past and present than similarities, and many remained

steadfast in their belief that modern conveniences such as electricity did not exist a half century ago.

Except for these overgeneralizations, though, students were generally successful in attempting to sequence pictures by looking for objects that did not exist at the same time. In addition, students often looked for changes in the style or type of objects. Most students justified their placement of the 1930s, 1950s, and 1990s pictures, for example, by pointing to changes in the style of the cars; some also noted that the petrol pump in the 1930s picture was a different type than would be used later. Fashion in clothes provided students one of the most common means for sequencing pictures. P3 Morna, for example, thought the 1950s picture was newer than the one from 1890s "cause they're not wearing olden day clothes like they are"; similarly, P4 Danielle thought the 1950s picture was newer because "there's a woman wearing a t-shirt." P6 Siobhán placed the Elizabethan picture between Roman and Edwardian and explained, "They used to dress like that, and after that they dressed like that." Like most responses, Siobhán's was very general; only a few students pointed to specific aspects of fashion such as bodices in the Victorian picture or waistcoats in the 1780s. But even without identifying such specific features, students had learned to recognize styles of clothing from several times in the past, and to sequence them in the correct order. Even when students placed two pictures at about the same time—1830s and 1890s, for example, or 1940s and 1950s—they often did so because they thought the clothes looked the same; P6 Kayleigh, for example, thought the 1830s and 1780s pictures were from the same time "because the men are wearing the same clothes, 'cause they're wearing tights and trousers with a waistcoat."

Other times students focused on the activities or ways of life depicted in pictures, rather than discrete physical objects. P3 Joshua thought the 1890s picture was older than 1950s because the people were making their own clothes and working by hand; similarly, P6 Louise thought 1890s was older because they have "woolen to make clothes and all, and they don't do that nowadays because they get it out of shops." With Set A, students

used that explanation most frequently when they explained why the 1780s picture was older than the 1830s or 1890s pictures. P5 Hayley, for example, thought it was the oldest because "you have to make shelter yourself and you'd have to make a fire and catch food for yourself," and P6 Stacey thought it was older than 1830s because "they're chopping down trees instead of going to buy wood." With Set B, students sometimes distinguished the Norman and Edwardian pictures on the basis of the violence in the former; P6 Nicole, for example, thought the Norman picture was older because "they're fighting," and "you can't fight and kill people in that time [Edwardian]"; similarly, P6 Nuala thought it was older because "they're wearing helmets and they're fighting and all, and these ones are just dressed ordinary and they're just helping each other."

Finally, students sometimes identified pictures either with periods associated with particular people or events (the time of Jesus, the Battle of Hastings, and so on) or with periods that have conventional names (such as *Victorian*). Many students identified only one picture in a set in this way, and thus the information was not helpful in sequencing. P3 Morna, for example, thought the 1830s picture looked like the time of Oliver Twist, P4 Kevin said the 1830s picture was "a cowboy thing," and P4 Benjamin thought the Inca picture looked like the time of Jesus; in each case, students used the information only to distinguish the picture from the present and not to locate it in relation to other pictures. But when students were able to identify more than one picture in this way, and when they knew the correct order of the people, events, or named periods, the correct sequence was obvious. Y8 Jason, for example, immediately sequenced the first two pictures in Set B correctly and said, "I think that comes from Medieval times and that comes from Victorian times." Similarly, P4 Aileen thought the Edwardian picture represented the time of World War II, and the Norman picture was of Vikings—"and that was ages before that." The picture students most often associated with a specific period was that of the Mesolithic Era, which they consistently identified as being before any of the others.

Strategy 2: Identifying patterns of historical change. As described in the previous section, one of the most common strategies students used was to look for aspects of pictures that they had learned stood in a particular order—whether specific people, events, and time periods, physical objects like cars and clothes, or ways of life like hunting or going to a shop. When they could identify such features, sequencing the pictures was easy, and students' responses were usually correct. Other times, though, students used a separate set of strategies, either because they didn't notice any such features, because they didn't know in which order they stood, or because they were looking for further evidence to support their placements. In this second set of strategies, students looked for examples of progress or development in the pictures—that is, they looked for items that existed in each of two or more pictures (clothes, buildings, roads, even landscape) but which seemed more complete or advanced in one. This differed from the first set of strategies in that students did not recognize features they already knew stood in a particular order, but had to decide on the spot which aspects looked bigger, better, or fancier—all of which were taken as evidence of being newer.

Students often put the 1890s picture before the 1950s, for example, not because the people in it wore a particular fashion they recognized as older, but because "the people have rags on them for clothes" (Colm, P4), or because "the clothes are more tattier and rags, and in there [1950s] they've got more recent fabrics," (Kayleigh, P6). Similarly, P4 Danielle thought the 1940s picture was newer than the 1930s because they would have had "scruffier clothes if it was older," P5 Cody thought the 1960s was newer than the 1950s because "the clothes have got a bit better," and P7 Ronan thought the 1900 picture was newer than the 1780s because "the clothes are made out of better material." Such observations were even more common among students working with Set B. P6 Padraig thought the Roman picture was older because in the Norman picture "they're wearing armor and everything and in that [one]...the boy's just wearing like a blanket over him"; he thought the Mesolithic picture was older still because "they're only wearing animal skins."

P5 Natasha also thought the Roman picture was older because the clothes were "not as tight," and that the Mesolithic was even older "because they've got fur there, and they've got designs on clothes there [Roman], and material."

Architecture was second only to clothes as an index of age, and again, students looked for evidence that buildings were somehow more advanced in some pictures than others. In explaining why the Mesolithic picture was oldest, for example, P4 Drummond said, "Look at the houses, it's just all rags over bits of sticks." Similarly, P5 Lucy thought the 1780s picture was the oldest in Set A "because the houses are tents and they haven't got a real fireplace," and P5 Liam noted the "wee tiny huts and all." Students frequently pointed to the building in the background of the 1990s picture to explain why it was the newest; P3 Robin observed that "they have a big, good shop behind," P5 Russell noted "they've got a nice big building," and P6 Eric suggested that there was "better technique in the houses." Several students also used the condition of the ground to judge age: They noted that the 1890s picture had only rough ground, the 1930s picture had a dirt road, and the 1950s picture had tarmac and lines on the road. As P6 Stacey said, "That one looks very very rough, that one's a bit smoother, but that one's very smooth."

But not everything has gotten bigger and better over time, and this strategy sometimes led students to make incorrect placements based on what they perceived as advances in material life. Slightly more than half, for example, thought the 1830s picture should be more recent than the 1890s (the most common mistake in either set), and their explanations focused primarily on the size of the buildings. Thus P4 Angus thought the 1830s picture was newer because it had brick walls instead of stone, tile roofs instead of thatched, and "big skyscrapers and large windows." Similarly, P5 Natalie thought it was newer because "the houses don't have thatched roofs...and it's got a far wider road, it's got bigger buildings," and P6 Louise explained that "the houses are more like bigger, and they're more like built with more stones." Students working with Set B sometimes made a

similar mistake by placing the Victorian picture after the Edwardian because the clothes looked "fancier."

Although they were making use of a strategy that was generally successful in helping them sequence the pictures, these students failed to recognize that different kinds of buildings (or other aspects of material life) could be found in different places at the same time—thus bigger buildings don't establish that a picture is newer, since there have been both large buildings and small for thousands of years. Several students, on the other hand, explicitly noted the possibility that different images could exist at the same time. P6 Dylan, for example, suggested that the 1830s and 1890s pictures might be at the same time, but that the people in the latter are poor and live in the country. Similarly, Y8 Deanna thought the two pictures "may be in different places, some places might be richer and some might be poorer, in different places." These students recognized that simply looking for bigger buildings or a higher standard of living was an inadequate means of establishing a period's place in historical time.

Students also looked for examples of progress in the physical features of the pictures themselves—sometimes treating them as though they were artifacts, and looking for evidence that some were older than others. P3 Robin thought the 1830s picture was older than the 1890s one because it was "blurry," and P4 Alexander thought the Roman picture was older than the Norman picture "'cause it looks kind of dusty and dirty." P7 Ronan even asked whether the 1900 picture had "been worn by, over time, or is it the way it came out?"; when told that the original picture was probably about the same quality, he concluded that it was older than the 1940s "'cause that looks very clear." P6 Dylan lamented his inability to use this strategy: He suggested that "they're trying to fool us" by making all the pictures black and white, since there were color cameras at the time of the most recent photographs.

The strategy of focusing on features of the pictures themselves—rather than the content they portrayed—arose most often when students worked with Set B, and it almost

always led them to place pictures in the wrong order. Just over half the students in P6 and below, for example, put the Edwardian picture before the Victorian, and they explained that placement by pointing to the color in the latter picture. Similarly, several students thought the Roman picture was newer than the Norman because it had more color, and some students even put the Edwardian picture at the same time as the Elizabethan because both were black and white. Several younger students even thought the world itself was less colorful in the past. Four P3 students suggested that people in the past only wore black and white (or gray) clothes, and P5 Natasha thought some pictures were confusing because "they look old, but the color isn't old," since "they didn't have as much paint and things in the olden days." Students in P6 and above continued to use color as a criterion for sequencing, but none suggested the world was actually less colorful in the past; when P6 Jeffrey heard that younger students sometimes thought clothes in the past were black and white, he said knowingly, "Natural, natural, natural."

Strategy 3: Co-ordinating personal and family experiences. A third strategy was used only rarely, but students recognized its power and were confident of their answers when they were able to employ it. In this strategy, students arranged pictures by comparing them to what they had learned either from their own direct experiences or from the experience of people in their families. The only picture taken during students' lives was the 1990s one in Set A, and students from one of the schools lived near the building in the background. These students reacted to the picture with immediate recognition—quickly putting it at the most recent end of the sequence and usually laughing or shouting at how obvious it was. Many students said they knew it was the most recent picture because "I've seen that," or "I've been there." Others recognized that simply having seen the building did not make it new, and they used more specific events from their own lives to establish its recency. P3 Matthew, for example, said "That was only made last year." P6 Kayleigh said that cars had only been allowed to park in front of the building for a year or two; another

student commented on the remodeling that had taken place a few years ago, and another thought the sign in front of the building had not been there long.

Because students were so young, they could not often use their own experiences in sequencing pictures, but they extended the effective range of this strategy by using their knowledge of their parents' lives. P5 Connor, for example, thought the 1930s picture was older than the one from the 1950s because "my daddy learned how to drive in something like that [the car in the 1950s picture], so it must be older." Similarly, P6 Siobhán thought the Edwardian picture was newer than the Victorian and Georgian pictures "because you see, that would probably be not far before when my dad was born [Edwardian], you see, and we've got pictures." When students were able to match pictures with their own or their families' experiences in this way, they were confident of their answers—they understandably regarded their first hand (or nearly first hand) experiences a reliable basis for sequencing times in history.

Summary and conclusions. Because almost no students recognized any of the specific pictures used in either set, their ability to sequence them correctly cannot be attributed simply to learning "when things happened." Students had not learned the order of these particular pictures, but they had learned a number of strategies for correctly sequencing visual images from the past. These strategies depended on a command of factual information, but they also required students to co-ordinate and manipulate that information in novel circumstances. One useful strategy was to look for items that were not used at the same time; cars, thatched roofs, shields, and so on provided important clues as to which pictures were older and which newer. Changes in the style of objects—particularly the fashion of clothing—were among the items students noted most often. Sometimes they also looked for clues in the activities depicted—spinning wool, for example, or building a fire—rather than in physical objects. And some students identified pictures with well-known people, events, or time periods, which they had learned occurred in a particular order. In each case, students were able to use these strategies to order the

pictures with a high degree of accuracy; mistakes arose only when students overgeneralized the differences between present and past by assuming that objects existing today must be of recent origin.

In addition to identifying specific objects or activities they already knew about, students also looked for examples of progress or development in material life—that is, they looked for clothes, buildings, or other features that seemed more complete or advanced in some pictures than in others. This strategy extended to characteristics of the pictures themselves, as students explained that some were clearer or had more color. This was also generally successful—particularly since students usually relied on it only to supplement other strategies or in the absence of more definite clues—because there have indeed been advances in technology and architecture over the years, and because artifacts can sometimes be sequenced on the basis of physical features. But this was also the strategy most likely to lead to mistakes. Looking for bigger buildings is not a reliable way of sequencing images in time, and using color is even less dependable. Again, students' tendency to overgeneralize aspects of change over time—particularly their failure to recognize that more than one image can characterize any given time period—was the source of their mistakes.

Finally, students sometimes sequenced pictures based on features they recognized from their own lives or the experiences of people in their families. When they saw a building that had been remodeled in the last few years, or when they saw a sign that had only been put up recently, they knew they were looking at a picture from the very recent past; when they recognized cars that looked like those in pictures from their parents' childhood, they knew the picture was at least relatively recent. Because students were so young, they were not able to use this strategy often, but they were confident of their judgments when they were able to do so. Presumably, as they get older and more times fall within the span of their own lives, this will become an even more useful strategy for arranging historical times.

Clearly, then, students' understanding of historical time is not the undifferentiated void that many people assume; their impressive ability to order pictures—described in the first section of this paper—is the result of their increasing mastery of overlapping and complementary strategies for determining the order of images from the past. Just as clearly, teaching students about historical time is not a matter of filling them with undigested factual information in proper order, nor is it a matter of leaving them to sort out information about the past on their own. Students know a great deal about changes over time, but they tend to make a few specific and predictable errors. It is to these errors that educators should pay particular attention.

First, because students often overgeneralize differences between past and present, they need to learn more about the similarities as well as the differences between past and present. A common instructional activity in Northern Ireland (as in the U.S.) is for students to complete charts detailing the differences between their lives and those of the people they study (whether Mesolithic people, Vikings, or their grandparents); valuable exercises like this should also include attempts to identify things that were the same as today. Students need to learn that Coca-Cola was around even when their grandparents were young, that dogs existed at the time of the Vikings, and that people could predict the seasons in the Neolithic era. Because students often assume that if we have something today (particularly if it's something good, like cola or pets or pickled onions) it could not have existed in the past, they need more experience learning about continuity in human history as well as change.

Second, because students often assume that material life has proceeded in a single, unbroken line of development, they need to learn about the diversity of images that can characterize each time in the past. History should always include a comparative dimension that enables students to see what life was like for a variety of people at any given time. The Northern Ireland Curriculum takes just such an approach in the P7 unit on Victorian Life, which requires that students learn about different social classes, about people in town and

country, and about society in Britain and Ireland. This research suggests that students would benefit from a similar approach in earlier years. In studying the Vikings in Ireland, for example, students would benefit from learning about both rural and urban areas, as well as about other contemporaneous societies; students studying Ancient Egypt should have the chance to see what life was like in other parts of the world at the same time. Students should consistently be exposed to a range of visual images from any given time so they do not assume that those images can invariably arranged in a single, linear sequence.

Systems of notation—periods, dates, and years

Modern western society uses three systems of notation for communicating ideas about historical time—dates (particularly years), number of years before the present, and names of recognizable periods. While each of these systems can be co–ordinated with the others—1798 was 200 years ago, during the Georgian Era—their use tends to vary both with the amount of accuracy desired and the social and cultural contexts in which they are used. Thus if I want to tell someone how old my house is, I can say it was built in 1896 (very specific), that it was built just over a hundred years ago (less specific), or that it's from the Victorian Era (much less specific). I would probably be most likely to use a date if I wanted to call attention to specific events occurring at the same time my house was being built; in the United States, 1896 is likely to bring to mind William Jennings Bryan, populism, and arguments over the gold standard. Saying it was built just over a hundred years ago, on the other hand, gives a greater sense of its age; if you wanted to know how old my house was and I replied, "1896," you would probably do some quick mental subtracting to get a feel for how long it's been around—just over a hundred years. Saying my house is from the Victorian Era, meanwhile, does little to narrow down its age but does a great deal to place it within the context of broad social (and architectural) trends; you won't know exactly how old it is, but you'll have an idea of what it looks like.

The relative importance of these designations also varies by the topic under discussion. A history of the troubles in Northern Ireland or U.S. involvement in Vietnam is likely to make extensive use of dates—not only years but months and days. The recency of the events, and their closeness to each other, lead us to look for narrow distinctions in their place in time; we want to know whether something happened in 1964 or 1969. A history of Mesolithic people in Ireland, on the other hand, will rely on the less specific designations of "years ago"; it doesn't matter to us now whether a burial site was constructed in 5985 BC or 6013 BC—"about 8000 years ago" tells us what we want to know. In general, the longer ago something happened, the less concerned we are with fine distinctions of time.

The relative importance of these systems also vary by location. Period names are much more common in Britain than the U.S.: *Roman, Tudor, Georgian, Edwardian,* and so on are in much greater use than their U.S. equivalents such as *Colonial* or *Antebellum.* (The imported *Victorian* is a relatively common designation in the U. S., but its frequency pales in comparison to its use across the Atlantic.) Perhaps because the national history of European Americans involves a smaller range of time—1492 to the present—than the history of Britain, historical time in the U.S. is more likely to be split into specific years instead of longer periods. Period names in U.S. history also bear the burden of having fewer clear boundaries: The Antebellum period ended in 1860 (or 1865) and the colonial era in 1776 (or 1783) but when did they begin? Periods named after the reigns of monarchs or the arrival and departure of invading armies have the advantage of being defined on both ends.

These differences in usage again call attention to how our understanding of time depends on a variety of culturally defined categories for dividing up the past. Analysis of students' understanding of historical time, then, involves examining how they use each of these three systems for communicating about the past—period names, dates, and number of years before the present. In interviews, after students had arranged pictures in the order they thought was correct, I pointed to each (beginning with the most recent), and asked,

"When do you think this is?"[5] In half of the interviews, students chose to respond with dates; about one-fifth of the time they responded with an answer phrased in terms of "years ago," and in the remainder they used a combination of dates, number of years ago, or the names of periods. (No students responded exclusively by using period names.) Although students appeared less comfortable and less confident during this task than any other portion of the interview, they nonetheless went along willingly, and their responses revealed a great deal about their understanding of systems of notation for historical time.

Use of period names. Although students rarely used the names of periods when asked when a picture was, those working with Set B frequently mentioned periods when they first saw a picture or when they discussed how they knew where it went in the sequence. As shown in Figure 10, students' use of period names increased steadily from P3 through Y8. Most students identified pictures with periods without explaining their reasoning—their recognition appeared to be both tacit and immediate—and thus the interviews provide little information on how they decided what period names should be associated with pictures. There were, however, some patterns in the pictures which students most often identified.

Figure 10. Average number of period names used (Set B)

P3	P4	P5	P6	P7	Y8
0.5	1.8	2.0	3.0	3.8	5.0

In Set B, the pictures students they most frequently designated by the name of a period were the Mesolithic—which they usually referred to as "the Stone Age" or the time

[5]A handful of students asked, "What do you mean?" and I replied, "Either what year you think it is, or how long ago you think it's from," which in each case appeared to clarify the request completely.

of "early man" or "hunters and gatherers"—and the Norman, which they usually referred to as the time of the Vikings. Other pictures to which students often attached a period name were the Roman picture (usually referred to as the time of Jesus or of the Greeks), the Elizabethan (identified as the time of Shakespeare, Queen Elizabeth, or "Prince James"), The Victorian (referred to as Victorian), and the Incan, which nearly all thought was the time of the Ancient Egyptians. (One P3 student identified it as "Indian," and one P7 student thought it was "Aztec.") The most common designations in set A were "Victorian" (usually used to identify the 1830s or 1900 pictures), "around the war time," (used for the 1900, 1940s, and 1960s pictures), and "cowboy times" (used for the 1790 and 1840 pictures); each of these were used in either five or six interviews.

The period names students used clearly reflect the sources of their knowledge and demonstrate their attempts to assimilate historical images to the times they had learned about. Students had seen pictures of the time of Jesus at home, at church, and at school, and the picture of a Roman boy in a tunic quickly evoked those images; similarly, World War II is a topic students encounter at home, at school, and in the media, and they thought various pictures appeared to be from about that time. Some of the most telling examples of students' use of period names, though, come from their identification of periods related to geographic regions other than those represented in the pictures themselves. Five students, for example, identified the 1830s picture as being from "cowboy times" or "the wild west"—despite the fact that it was clearly labeled "High Street, Belfast." Although their periodization was approximately correct, the designation they used arose from their experience with television and movies. ("I watch nearly all Western movies," P6 Stacey said.)

Other examples show how students used what they had learned in school to identify pictures which were not directly related to that content. Many of the most common period names were those of topics in the curriculum—Victorians, Vikings, Egyptians, and the Mesolithic—although students had often learned about these times from siblings and used

the terms before they had formally studied them. Nearly all students who gave a period name to the Norman picture referred to it as "Viking." Again, their designation was chronologically correct—the Vikings were at the height of their influence in Ireland in the century before the Battle of Hastings—but since they had not learned about Normans in school or elsewhere, they used the nearest category that seemed to apply. Most students also identified the Incan picture as being from the time of Ancient Egypt. Although the particular details of the picture made that a very reasonable estimate, students' responses again demonstrated their attempt to assimilate as many periods as possible to the times they were able to name.

Understanding of dates and years before the present. Students understood most linguistic conventions for identifying times in the past. All those who used dates, for example, phrased them as combinations of two-digit numbers—that is, "nineteen thirty-five" or "the thirties" rather than "one nine three five," "one thousand nine hundred and thirty-five," or any other construction. Similarly, nearly all students who responded with a number of years stated them as cardinal numbers followed by "years ago," (i.e., "seventy years ago.") From the earliest ages, students also correctly used linguistic conventions to indicate a ranges of date; instead of giving specific figures such as 1974 or 1863, that is, most used expressions like "nineteen sixties," "nineteen seventy something," "early fifties," or "about the nineteen forties." We are so used to these linguistic conventions that we rarely think of them consciously, but as with all aspects of history, they are simply cultural construction that children have to learn—and even the six year olds in this study had already mastered them.

Other conventions for expressing dates revealed some systematic mistakes by students. Although some used expressions in idiosyncratic ways—such as saying a picture was "thirty years behind now"—there were three expressions that students regularly used in ways that did not accord with adult conventions. First, a few students used the term "nineteen hundreds" with the apparent meaning of the first decade of this century (rather

than the entire century); that mistake is understandable, since there is no other common way of referring to that time other than by saying "the first decade of this century." Secondly, several students generalized from the accepted shortening of decades ("thirties" to refer to the 1930s) and produced a similar but incorrect form for centuries ("sixteens" to refer to the 1600s). And finally, every student who used an ordinal number to designate a century did so incorrectly—thus "eighteenth century" consistently was used to refer to the period from 1800 to 1899, "seventeenth century" to the period from 1700 to 1799, and so on

Nearly all students understood the arithmetical basis of dates and number of years before the present. No student suggested a date in the future for the pictures, and nearly all gave dates that went in numerical order. Most of those who did give dates out of order did so only once, and each time the mistake appeared to arise either because students made a last minute change in the order of the picture or because they switched from using dates to using a number of years before the present. Sometimes when students made such mistakes (or when they misspoke), their partners corrected them by pointing to the arithmetical basis for the ordering; when P3 Joshua gave a date of 1980 for one set of pictures and then suggested 1990 for an older set, his partner Luke said, "1990?! They are older than them, so if that's older than that, then that has to be older, so that would have to be 1970-something or 1960s." Similarly, when P5 Dustin gave an estimate that was out of order, his partner Victoria said, "It can't be 150 [years ago], if this one's meant to be 400, that can't be 150."

But while students understood the arithmetical meaning of dates, they had more difficulty using and manipulating dates. Many students misspoke and corrected themselves frequently when estimating dates; in dating the 1830s picture, for example, P5 Liam said, "16-, when was the wild west? That'd be 17-, no, 1970, no the 16, 1670s." As noted above, students most frequently gave a series of estimates that in the wrong numerical order when they tried to switch from dates to years before the present (or back again); P6 Edward, for example, thought one picture was fifty years ago, then estimated the next

picture to be about 1970. Some students were well aware of their difficulty in manipulating dates. P5 Natasha, for example, suggested that the Victorian picture was "1991, or maybe lower than that, but I don't know how to go down." And P5 William thought the 1960s picture looked like "around the Beatle times, whenever the Beatles were singing"; when I asked him when that was, he said, "I have no idea, but my mum said they were around the time that she was alive." I then asked, "How long ago was that?" and he said, "Well, she's thirty–nine now, so I don't really know." William's strategy for establishing the date of the picture was a sound one, but he was unable to perform the arithmetical operation (or at least to do so quickly).

Strategies for assigning dates and years before the present. As noted in the introduction, many people equate understanding historical time (or history generally) with the ability to assign dates to people, events, or time periods. While the burden of this study has been to establish that historical time is far more complicated than that equation suggests, one goal of the research—albeit a minor one—was to gauge the accuracy of students' estimates of dates (or number of years ago) for times past. While it would be possible to compare the actual date of each picture with the average of the estimates given by students, such analysis would yield little meaningful information because of the enormous range of variation each picture elicited. When a single picture such as the one from the 1780s yielded estimates ranging from twenty years ago to millions of years ago—and including estimates of 1498, 1782, and 1940— a statistical approach would hide more than it reveals. But the answer to the question, "How accurate were students' estimates?" can be easily summed up: Not very. Indeed, if accuracy of dating were the only index of historical understanding, then children's reputation for failing to understand the topic would be well–deserved. But as with most aspects of the topic, students' attempts to assign numerical estimates to pictures reveal a much greater degree of complexity than is at first apparent.

Students' estimates of dates and years reveals their efforts to use a variety of strategies to identify reference points in time—benchmarks that allowed them to establish dates or years for pictures. One way students established these reference points was by using dates from their own lives. Although students were too young to apply this strategy often, they universally used it when possible. The one picture they consistently dated correctly was the 1990s one in Set A. Students knew that it looked like a time in their own lives, and they knew that meant a date in the 1990s; as noted earlier, one P6 student suggested it must be from 1996 or 1997 because cars were parked in front of the building, and until last year they were only allowed to park in back. Others identified the picture with expressions like "now" or "a few months ago." In Set B, many students also identified the Modern picture as "close to now" and assigned it dates ranging from the 1960s to the 1990s.[6]

A more common means of establishing benchmarks was to compare pictures to events in the lives of people they knew. P4 Jessica, for example, disagreed with her partner's first estimate of one group of pictures by saying, "But when my mum was a wee girl they used to have them, and my mum's only like a few years old"—she concluded that the pictures were about twenty years old. Similarly, in trying to date the Edwardian picture (which she thought was from about the time of World War II), P4 Aileen said she was trying "to think of the age of one of my teachers, 'cause he got adopted"—presumably meaning he was sent to the countryside during the bombing raids—and concluded that it was about sixty years ago. P5 Natasha had begun her estimates by counting backward—she thought the Victorian picture was 1991, and the Georgian was twenty or thirty years ago—but looking at the Georgian picture she changed her mind "'cause my mom wasn't like that, I've got a picture of her when she was little." As noted earlier, students sometimes used events from their lives or the lives of people they knew to determine the

[6]The only other time this strategy arose was when P4 Jessica gave the date 1993 for the Victorian and Edwardian pictures; Drummond disagreed because "that's what I was born" (and presumably the world couldn't have looked like that in his lifetime).

order of the pictures; in these cases, students went even further and used their knowledge of the age of those people to assign dates. Even when students were unable to produce estimates, they recognized the potential power of using the experiences of family members to establish dates. In trying to date the 1960s picture, for example, P7 Marie said, "I'm trying to think of how old my parents would be." Similarly, P6 Jodie thought one of the pictures was from the time "when our parents were born"; her interview partner Chelsea said, "Yeah, but when was that?"

The third way students established benchmarks was by associating pictures with historical periods whose approximate dates they had learned. Many students knew the names of periods without being able to identify corresponding dates, but a few periods triggered accurate estimates by a number of students. One of the periods they most often associated with a specific date was "around the war time." When students had identified a picture as being from the time of the war, some were then able to assign it a date from the 1940s. Another period students consistently dated accurately was the time of Jesus; whenever I asked students when he lived, they gave accurate responses such as "the year zed," "two thousand years ago," or "the start of AD" The only other period which many students associated with a date was the time of the Mesolithic picture. P5 Victoria knew that the last ice age ended 10,000 years ago, and she estimated that the Mesolithic picture must be from about 9000 years ago since she knew they came to Ireland later than that; many other students used the designation "BC" when dating the Mesolithic picture, even when they were less sure of the precise number of years. While no other single period of history was mentioned as often as these, some students knew the dates of other times as well. P7 Darren, for example, knew that the Norman picture came from the tenth century (i.e., 1000-1099), that the Elizabethan picture was from the time of Shakespeare, "and that wasn't until the 15th century [i.e., 1500-1599]," and that the ancient Egyptians were about 6000 years ago. Again, students were aware of the power of this strategy even when they

were unable to apply it; P7 Ailbhe was certain that the Elizabethan picture was at the time of Shakespeare but said, "That's the problem, I'm not sure when Shakespeare was."

If students had so many strategies for assigning dates, why was their accuracy so poor? The answers lies not in a lack of understanding of the meaning of dates, but in a lack of the kind of benchmarks described above. In many cases, the only reference point students had for dating was their recognition of the most recent picture. With no further benchmarks, these students were forced simply to count backwards from the present and to assign dates in standard intervals of decades or centuries. P6 Alice, for example, counted backward by either one or two decades for each of her estimates; P4 Jack and Samuel used a similar strategy, although with less consistency. (See Fig. 8 for illustrations of these and following examples.) P6 Gary, on the other hand, counted backward first by one decade, then by two, then three, and finally by four decades. P6 students Louise and Colleen counted backward by centuries instead of decades, and thus produced a much greater range of estimates than most other students; estimates by P6 students Eric and Paul are somewhat less systematic, but reveal much the same strategy and results. P5 Joanna and Mairead, meanwhile, used much smaller intervals, and thus produced a much smaller range of dates in their estimates. Students who worked with Set B and those who used a number of years ago instead of dates often followed the same pattern, as seen in the responses of P5 students Jade and Natasha. Some students were explicit about their strategy: When the interview strayed off topic, P6 students Leanne and Sharon, upon returning to the dating portion of the task, checked to find out what their last estimate was before making the next one.

Simply counting backward by years, decades, or centuries is not a useful strategy for assigning dates, as many of these estimates demonstrate. That students who used the strategy produced any accurate dates at all is due largely to the fact that many of the pictures in Set A were in fact separated by single decades, and a few of the pictures in Set B were separated by single centuries. But many students also recognized that the strategy of

counting backward in standard increments would not work for the entire set of pictures: They knew that some pictures were separated by greater periods of time than others, and thus they used the strategy only up to a certain point, after which they abandoned it in favor of more widely separated dates. P7 Patricia, for example, gave dates from the 1970s, 1960s, and 1950s for three of the most recent groups of pictures, then gave a disproportionately older estimate for the next group, and a much older estimate for the oldest picture. (See Figure 9 for an illustration of this and the following examples.) P5 Liam and Dermot, meanwhile, began counting backward by decades, then switched to counting backward by centuries when they reached the three oldest groups of pictures in Set A; similarly, in working with Set B, P6 Reece counted backward by centuries until he reached the oldest three groups, when he switched to millennia. P5 Lucy's final estimate was even more extreme: She counted backward by about three decades for most pictures but then suggested, quite seriously, that the oldest picture in Set A (1780s) was millions of years ago.

Recognizing a greater relative distance between two pictures, then, may have led to greater spacing of dates, but it did little to increase their accuracy. This failure highlights an important aspect of students' thinking: They did not have an independent understanding of dates and years that allowed them to translate distance in time into accurate numerical estimates. Knowing that a picture was "much older" led to no consistent estimates of *how many years ago* it was. At one extreme is Lucy's recognition that the 1780s picture is much older than the others and her conclusion that it was millions of years ago. (Other students also made extreme estimates at the older end of the sequence.) At the other extreme is P6 Jeffrey, whose partner had just dated at the 1930s picture at 1940; Jeffrey thought the 1830s picture must be *much* older than that, and concluded that it was from 1935. P7 Kenneth and Seamus also thought the 1830s picture was "way back"—agreeing that it was about sixty years ago. And P5 Anthony and Desmond thought the Inca picture was "very old, about the stone age"—which they thought would be between the 1890s and 1930s.

Fig 8 Estimating Dates by Counting Backward

Alice (P6)

Picture	1990s	1940s/1950s	1920s	1960s	1900	1780s	1830s/1890s
Estimate	now	1960s	early 1950s	1940s	1920s or 30s	early 19th century [i.e. 20th century]	1880s or 1890s

Jack and Samuel (P4)

Picture	1990s	1940s/1950s/1960s	1900/1920s	1890s	1780s/1830s
Estimate	Now	1950s	1920s	1910	1900

Gary (P6)

Picture	1990s	1900/1920s/1950s/1960s	1920s	1890s	1780s/1830s
Estimate	1996	1980s or 1970s	1960s	1930s	1890s

Louise and Colleen (P6)

Picture	1990s	1960s	1940s	1950s	1920s	1830s	1780s	1900	1890s
Estimate	1993	1960s	17- or 1800s	1770	16- or 1700s	1600s	1650	15- or 1600s	14- or 1500s

Eric and Paul (P6)

Picture	1990s	1960s	1940s	1950s	1920s	1900	1830s	1890s	1780s
Estimate	1996	1986	1850	1838	1790s	1720	1698	1670s	1450s

Joanne and Mairead (P5)

Picture	1990s	1900/1950s/1960s	1920s/1940s	1830s	1780s/1890s
Estimate	Now	9 or 10 years ago	13 years ago	15 or 16 years ago	20 years ago

Jade and Natasha (P5)

Picture	Modern	Victorian	Georgian	Edwardian	Elizabethan	Roman	Norman	Mesolithic
Estimate	1993–5	1991	30–50 years ago	60–80 years	70–80 years	90–95 years	110 years	120 years

Fig 9 Counting Backward with Provisions for Relative Distance

Patricia (P7)

Picture	1990s	1960s	1940s/1950s	1900	1830s/1890s	1780s
Estimate	1996	1975	1960s	1958	1900-1920s	17th century

Liam and Dermot (P5)

Picture	1990s	1920s	1960s	1900/1950s	1940s	1830s	1780s/1890s
Estimate	1984	1970s	1970	1960s	1780s	1670s	1520

Reece (P6)

Picture	Modern	Edwardian	Victorian/Georgian	Elizabethan	Incan/Roman	Norman	Mesolithic
Estimate	1960	1930	1830	1720	1000 years ago	2090 years	8000 years

Lucy (P5)

Picture	1990s	1920s/1960s	1950s	1900/1940s	1830s/1890s	1780s
Estimate	now	months ago	40 or 50 years ago	70 years	100 years	millions of years

Students' mistakes in estimating the number of years that accompany relative distance are notable precisely for their lack of pattern: Some gave remarkably inflated estimates, some gave ridiculously low estimates. As with other aspects of their understanding of time, their learning did not proceed in a single developmental direction.

Summary and conclusions. As students got older, they were increasingly adept at using their society's conventional systems for designating historical time—periods, dates, and number of years before the present. We all know that such systems mean more to older students than to younger ones, but this research shows that such progress is not the result of an increased "ability" to understand dates, still less a sudden leap in their cognitive maturity. The youngest students in this study already knew how to use dates and numbers of years before the present, and nearly all students had mastered the arithmetical and linguistic conventions for doing so. Differences among students lay not in their ability to understand dates, but in their ability to match pictures with specific times—and this ability arose from their differential use of specific reference points to establish when something happened.

Students gave more accurate responses when they were able to establish more reference points than the 1990s; less accurate responses occurred when they had no recourse but to count backward from the only date they knew with certainty. That is, students did not develop a cognitive understanding of what dates meant, which they were then able to map onto their understanding of relative distance in time; rather, they learned to coordinate a variety of strategies for establishing dates (and periods) based on their personal experience, the experiences of people in their families, and the factual information they had learned in school and out. Students tried whenever possible to latch onto such benchmarks in their attempts to identify times for the pictures. As noted earlier, simply knowing more about a period did not necessarily help students locate it in time, but being able to recognize a time and simultaneously to connect it with a date or a number of years before the present enabled students to give more accurate responses.

The more different times children know about, then, the more complete their understanding of systems for measuring historical time will be—and if developing students' ability to use those systems is a goal of instruction, they need to learn about many different times in history. Studying three specific periods in history will enable children to identify those three periods, and they will assimilate as many other times to those three as they can. School is not the only source of their knowledge, and students will also use what they have learned at home, at church, and in the media to further extend the times they recognize and the dates they can match to those times—but they will still depend on the benchmarks they have picked up from those sources. They will not magically begin to understand systems for measuring time, after which they can start learning history; they will begin to use those systems with greater facility by learning more historical content that makes use of those systems. There is no point in waiting for children's understanding of dates to develop, because their understanding of dates is the product of their learning.

Conclusions

This research has identified several consistent features of children's understanding of historical time. First, even young children can sequence a series of pictures from the past with a high degree of accuracy. As they get older, they make increasingly fine distinctions among times in the past, and they sequence those times with increasing accuracy. As in previous research, the visual element of this task may have been the key to tapping into students' understanding; each picture gave them a variety of clues on which to base their judgments. One pair of students clearly described why pictures made the task easy:

> Liam: Because it [the interview task] shows you pictures, and how it would have been, and pictures that you've read, and you picture things in your head. And then when people puts things in front of you like you're doing, we just picture, right: We've read this book, and it said *old people*, and *they were working very hard*, and *then smart people invented things*, and then they would be getting more newer and then

newer [pointing to the series of pictures], and then people keep on going, and then people invented all these cars, so they'd be traveling and not walking.

Interviewer: So you had those pictures in your head already, and then when you saw these you could just match them up?

Liam: Aye, because I don't read the books, I look at the pictures.

Dermot: That's what I do.

Students also were familiar with systems for measuring and describing historical time: Even the youngest knew the meaning of dates and understood most linguistic and arithmetical conventions for using them, and as they got older they were able to date an increasing number of pictures with accuracy. They began identifying pictures with the names of periods somewhat later, but they were able to use these too with a high degree of accuracy. In sum, students knew a great deal about historical time—much more than they are usually given credit for.

One consistent feature of students' understanding was their use of a specific set of strategies for sequencing pictures and assigning dates: They based their decisions on personal experience, on the experiences of people in their family, and on the information they had learned in school and out. They looked to these sources to provide clues based on changes in material and social life, or for information on the order and date of different periods in history. Their ability to differentiate, sequence, and date pictures increased with age not because they developed a greater understanding of time, but because they had more experience and information on which to base their decisions. Students made mistakes or gave partly inaccurate responses when they had limited background knowledge and had to generalize from what they knew. Thus when they tried to sequence pictures, some students assumed that if something exists now, it did not exist in the past; others assumed that objects that were bigger, fancier, or more developed were necessarily newer. Similarly, in dating pictures, students often assimilated pictures to the periods they knew about—

referring to a picture of Belfast in the 1830s as "cowboy times," for example—or simply counted backward from the one date they knew with certainty.

Portions of this research were designed to provide comparisons with a previous study conducted with students in the U.S. (Barton and Levstik, 1996; Levstik and Barton, 1996). Although that research was not analyzed in exactly the same way as the present study, and although U.S. students did not work with pictures equivalent to those in Set B, their responses to pictures from the last 200 years nonetheless provide some important comparisons to those of students in this study. As in Northern Ireland, even the youngest students in the U.S. made distinctions in historical time, and the number and complexity of these increased across grade levels. Also like students in Northern Ireland, those in the U.S. were able to sequence the pictures with a high degree of accuracy. Even the pictures most often misplaced were the same in both studies—those from the first and second half of the 1800s. The strategies students used in determining the sequence of pictures were also similar: They looked for information on changes in social and material life, and they drew upon information they had learned both in school and out, including the experiences of family members. U.S. students also frequently overgeneralized from this information—their assumption that items we have now did not exist in the past, and their tendency to count backward from the present, were nearly identical to the responses of students in Northern Ireland.

Yet there were also important distinctions between students in the two countries. One of the chief differences lay in the amount of historical knowledge younger students used to differentiate and sequence pictures. In the U.S., students below fifth grade (the equivalent of P7) rarely gave specific examples of historical information in sequencing pictures; their explanations were very general, and those below third grade often simply compared pictures to the present rather than differentiating them from pictures they considered older or newer. In Northern Ireland, students at the equivalent grade levels made more distinctions in time and explained those distinctions by referring to an explicit

body of historical knowledge; students in P6 and before could confidently discuss Mesolithic people, Vikings, Ancient Egyptians, and the World War II era. Only in fifth grade and above did U.S. students make as many distinctions and use a comparable level of historical information in describing them. These difference arose, at least in part, from the school curriculum: As noted earlier, students in Northern Ireland begin formal study of history three years earlier than those in the U.S. Northern Ireland students are drawing inferences from historic photographs and analyzing diagrams of Mesolithic settlement patterns while their U.S. counterparts are still coloring in dittos of the Pilgrims.

Students also differed in their use of systems of notation for historical time. Although students in both countries had mastered most of the linguistic and arithmetical conventions for using dates from a young age, those in the U.S. were much more likely to identify pictures by dates rather than period names or number of years before the present; in fact, these last two systems were almost never used by students in the U.S. In Northern Ireland, both primary classroom instruction and the history parks and museums that form an important basis for students' historical knowledge are more likely to use years before the present than dates, because of the antiquity of the topics with which they deal; it is not surprising, then, that students there were more like to use this method of identification, even for more recent periods of time. And as already noted, period names are much more common in Britain (and Ireland) than in the U.S.; in fact, when I described preliminary results of this study to a group of educators in Northern Ireland, one member of the audience observed, "The dates don't really matter—what's important is whether they get the periods right." The relative frequency of students' use of each of the three systems of notation reflected their importance in the societies of which they were part.

These findings demonstrate that understanding historical time is a complex and multifaceted set of skills and that each of its components is learned. Students' differentiation, sequencing, and dating of historical time all depend on the nature and amount of information they have at their disposal—information that is learned in specific

settings and that varies from one location to another. Their understanding does not proceed in any neat developmental sequence, because these sources provide them with information about many periods simultaneously. Developing students' understanding, then, means providing them with the information they need to make further distinctions in time and to connect those periods with systems of measurement. By learning more about change over time, by studying more times and how they relate to the periods before and after them, and by seeing dates and other tools of measurement associated with the visual images they are beginning to recognize, students will better understand historical time. It is a set of skills educators can nurture, not an ability whose development they must wait for or whose absence they must lament.

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Appendix A

Interview Protocol

In just a second, I'm going to show you two pictures from different times. What I'd like you to do is put the picture you think is from longest ago here (point to students' left) and the one you think is closest to now here (point to students' right). Then I'd like you to explain what makes you think one picture is older and one is newer. Do you have any questions before we start? [Show first two pictures.] Here are the first two pictures. Remember to put the one you think is closer to now here, and the one you think is longer ago here. [Wait for students to place pictures.] Explain why you think this one's older and this one's newer.

* * *

Now, I have some more pictures. I'm going to give them to you one at a time. For each one, tell me where you think it goes—in between two of them, or before, or after, or at about the same time as one of them. Explain why you put them where you did, just as you did with the first two pictures. Do you have any questions? Here's the next picture. [Show each picture, wait for students to place them, and then ask them to explain why they think one's older and one's newer.]

* * *

[Point to each picture] When do you think this is?

* * *

Did you think this was easy or hard to do? What things made it easy or hard?

Which pictures did you think were the easiest to figure out? Why?

Which pictures did you think were the hardest to figure out? Why?

Which pictures did you think were most interesting? Why?

If you were alive at this time, how do you think your life would be different than it is now?

Now I have some questions that aren't just about the pictures.

How do people know what happened a long time ago?

What are some of the main things that have changed over time? Why have things changed over time?

Why do you think people dressed differently in the past? Do you think they acted differently than they do now? Why? Do you think people treated each other differently in the past? Why?

What kinds of things have you learned about history or the past or long ago at school? Why do you think history is something you study at school? Why is it important?

Have you ever learned about history or the past or long ago anywhere other than at school?

Do you think learning about history or the past or long ago is interesting? Why?

Later on in school, like next year or when you get to secondary or grammar school, what do you think are some of the things you'll learn about in history? Can you think of any famous people or famous events that you think you'll learn about someday?

Appendix B

Number of Students Interviewed by Grade Level and School

	Integrated	Controlled	Maintained	Total
P3	10	0	0	10
P4	10	6	7	23
P5	12	6	8	26
P6	13	6	8	27
P7	9	6	8	23
Y8	8	0	0	8
Total	66	24	31	121